

ECON 3740: INTRODUCTION TO ECONOMETRICS

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Lecture 8

Lecture outline

Last lecture, we summarized the topic four, and some parts of topic five.
Today, we will

- continue with topic five - carrying out an empirical project
 - Introduction
 - Conceptual (or theoretical) framework
 - Econometric models and estimation methods
 - Data
 - Results
 - Conclusion
 - Style hints

- short review session. If you have questions about the practice problems, we can discuss them.

Carrying out an empirical project: Writing an empirical paper - introduction

- Writing an empirical paper
 - A succesful empirical paper combines a careful, convincing data analysis with good explanations and a clear exposition
- Introduction
 - State basic objectives and explain why the topic is important
 - Literature review: What has been done? How do you add to this?
 - Grab the readers attention by presenting simple statistics, paradoxical evidence, topical examples, or challenges to common wisdom
 - One may give a short summary of results in the introduction

Carrying out an empirical project: Writing an empirical paper - conceptual (or theoretical) framework

- Conceptual (or theoretical) framework
 - Description of general approach to answering your research question
 - You may develop/use a formal economic model for this
 - For example, setting up a utility maximization model of criminal activity clarifies the factors that matter for explaining criminal activity
 - However, often common economic sense suffices to discuss the main mechanisms and control variables that have to be taken into account
 - As one is in most cases interested in answering a causal question, a convincing discussion of what variables to control for is essential

Carrying out an empirical project: Writing an empirical paper - econometric models and estimation methods

- Econometric models and estimation methods
 - Specify the population model you have in mind
 - Example: effects of schooling on growth

$$\ln(GDP_i) = \beta_0 + \beta_1 \ln(Population_i) + \beta_2 \ln(investment_i) + \beta_3 \ln(schooling) + \beta_4 \ln(income_i) + \mu_i$$

- Example: effects of alcohol consumption on college GPA

$$colGPA_i = \beta_0 + \beta_1 alcohol_i + \beta_2 hsGPA_i + \beta_3 SAT / AP_i + \beta_4 female_i + \mu_i$$

Carrying out an empirical project: Writing an empirical paper - econometric models and estimation methods

- Econometric models and estimation methods
 - Explain your functional form choices
 - After specifying a population model, discuss estimation methods (OLS)
 - Describe how you measure the variables in your population model
 - Discuss why OLS assumptions hold

Carrying out an empirical project: Writing an empirical paper - data

- Data

- Carefully describe the data used in your empirical analysis
- Name the sources of your data and how they can be obtained
- Time series data and short data sets may be listed in the appendix
- If your data is self-collected, include a copy of the questionnaire
- Discuss the units of measurement of the variables of interest
- Present summary statistics for the variables used in the analysis (a descriptive stats table)
- For trending variables, growth rates or graphs are more appropriate
- Always state how many observations you use for different estimations

Carrying out an empirical project: Writing an empirical paper - data

- Example: effects of public debt on growth

$$GDP_i = \beta_0 + \beta_1 Population_i + \beta_2 investment_i + \beta_3 schooling + \beta_4 income_i + \beta_5 debt_i + \mu_i$$

Table: Descriptive Statistics

Variables	Mean	Std Dev	Max	Min	Observations
Growth	0.0159	0.0234	0.0827	-0.0995	320
Initial Income	8.8999	1.1646	11.3009	6.0932	320
Investments	3.0615	0.3389	3.8915	1.8732	320
Population Growth	-2.7211	0.1611	-2.3847	-3.4415	320
Schooling	0.7176	0.7624	2.0109	-2.1835	320
Public Debt	4.0032	0.5922	6.2207	2.1736	320

Carrying out an empirical project: Writing an empirical paper - results

- Results
 - Present estimated equations, or, if there are too many, present tables
 - Always include things like R-squared and the number of observations
 - Are your estimated coefficients statistically significant?
 - Are they economically significant? What is their magnitude?
 - If coefficients do not have the expected signs, this may indicate there is a specification problem, for example, omitted variables
 - Relate differences between the results from different methods to the differences in the assumptions underlying these methods

Carrying out an empirical project: Writing an empirical paper - conclusion and style hints

- Conclusion
 - Summarize main results and conclusions from them
 - Discuss caveats to the conclusions drawn
 - Suggest directions for further research
- Style hints
 - Choose a title that is exciting and reflects the papers topic
 - Papers should be typed and double-spaced
 - Number equations, graphs, and tables
 - Refer to papers by author and date, for example, White (1980)

Carrying out an empirical project: Writing an empirical paper - style hints

- Style hints

- When you introduce an equation, describe important variables

- Example: $dp_t = \beta_0 + \beta_1 dp_{t-1} + \beta_2 MO_t + \beta_3 MY_t + \mu_t$

	lag dp	MO and lag dp	MY and lag dp	MO, MY, and lag dp
Constant	-0.36789** (0.01399)	-0.5131** (0.013346)	-0.39517*** (0.00599)	-0.52865*** (0.00783)
lag dp	0.889*** (0.00000)	0.87511*** (0.00000)	0.75701*** (0.00000)	0.74519*** (0.00000)
MO		0.05327 (0.30592)		0.04904 (0.32427)
MY			-0.50387*** (0.0009)	-0.50018*** (0.00099)
Observations	114	114	114	114
Adjusted R^2	0.777	0.777	0.797	0.797